

BLM LIBRARY



88016598

OFFICE COPY
DO NOT REMOVE
NOV 23 1984

COMMENTS ON AIR QUALITY
DATA FOR TRACT C-b

RADIAN
CORPORATION

8500 Shoal Creek Blvd./P.O. Box 9948/Austin, Texas 78766/(512)454-4797



RADIAN CORPORATION

RC# 100-056

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

COMMENTS ON AIR QUALITY

DATA FOR TRACT C-b

19 September 1975

Prepared by:

Radian Staff

88016586

TD
195
.04
E5871
1975
C.3

A. BACKGROUND

This memorandum discusses factors relating to the collection of air quality and meteorological data at Federal Oil Shale Tract C-b. The basic contention of this memo is that if the monitoring is done properly, 90% data collection for air quality and 95% for meteorology is not a reasonable criteria using best available technology in the remote location of Tract C-b. We believe we have evidence to demonstrate this.

The concept of 90%/95% data collection can mean different things depending on the interpretation of the data base and the criteria for deciding whether an instrument is "down" (i.e., whether a particular set of data is acceptable).

The existing stipulations are not based on a carefully reviewed criteria; thus they cannot serve as guidelines, but are subject to any of several interpretations. A strict interpretation of the data base would mean 365 twenty-four hour days. A less strict interpretation would mean that amount less time used in calibration. A liberal interpretation would mean 365 twenty-four hour days less time for calibration less time when the systems could not be tended or operated because of loss of electrical power, severe weather conditions, catastrophic failures due to vandalism, etc. The mining stipulations specify monitoring of air quality over 90% of each lease year and meteorology over 95%, which would seem to imply a strict interpretation. Exclusion of calibration time would seem reasonable; however, this is an interpretation of the stipulations and not a guideline provided by them. A major failing of the stipulations is that they do not stress quality, but only quantity. Thus, they would seem better designed to assure the collection of data even though it may not be defensible. This is unfortunate since this is a continuing fault of much of the monitoring networks in the nation.

The question of when an instrument is "down" can become quite subjective. The purpose of a calibration is to determine whether an instrument responds properly to gases of known concentration. "Responding properly" in this context means exhibiting a stable output which faithfully represents the known concentration. Determining whether a particular set of data is acceptable also becomes quite subjective. The basic goal should be to obtain an accurate representation of the actual air quality. For species such as SO_2 and H_2S the background levels at Tract C-b are often near or below the detection limits of the instruments, thus, an inspection of the data may not reveal whether the instrument output was zero because the ambient levels were below the detection limit, or whether the output was zero because the instrument was down. A questionable instrument could be left in the zero mode for long periods while awaiting repairs without violating the letter of the stipulations. Unless calibrations are performed frequently, there may be considerable periods when it is not clear if the instrument was operational. It should be noted that the criteria for acceptability of data may vary considerably from one type of monitoring situation to another. All instruments have some basic instability (noise), and they also tend to normally drift within certain limits as a function of time. This must be considered during the calibration, and minor adjustments in zero and span levels are not considered evidence of a "down" instrument. Taking an SO_2 monitor as an example, a zero drift of 10 parts per billion per day (1% of full scale) is not unusual. If the analyzer is calibrated every three days, and if the true background SO_2 concentration is 10 ppb, an output of 30 ppb might be obtained during the third day of monitoring (30 ppb is the annual standard for SO_2). In terms of obtaining an accurate representation of the air quality at Tract C-b, this is an unacceptable error. (Although many people assume the drift is linear and attempt to correct for it, this is

generally not a dependable assumption. Drift occurs because many factors, such as instrument temperature changes, flow charges, electrical changes, and unknown parameters. At some times these factors may cancel each other, at other times they may reinforce each other.) On the other hand, this same analyzer might be used near a smelter to compare 3-hour averages to the 3-hour federal standard of 500 ppb. A 20 ppb drift after two days in this case would be of little concern. It can be seen that calibration frequency becomes quite important not only in providing accurate data but also in defining the periods when an instrument was down. In a case where background levels often are near the detection limit, and when calibration is performed infrequently, e.g., once every two weeks when the calibration check reveals that the instrument is down it may be impossible to tell if it went down the first day after the previous calibration or the fourteenth day. This is critical information if the monitoring goal is 90% data collection. Furthermore, even if the instrument is found to be in calibration after an extended operating period, this does not mean that it was in calibration throughout that period. Instrument drift may occur in either positive or negative directions with time.

B. RADIAN'S CRITERIA FOR DATA ACCEPTANCE AND
OPERATIONAL PROCEDURES

Radian's data base for the purposes of calculating data capture is 365 days and the basic data packet is a five-minute average. On any day when less than half the available five-minute averages are collected on a particular data channel, that channel is marked down for the entire day.

It should be noted that Radian operates a complete spare air quality station at all times. Thus, with one station completely down, the lease environmental stipulations requiring monitoring at four sites are still satisfied. This provides a real advantage in data collection, however, based on the criteria of accepting only accurate, defensible data, Radian believes that 90% data collection in the Tract C-b environment is not reasonable even for a five station system. We also believe that for everyone's protection, only accurate, defensible data should be accepted. It is highly likely that some outside party will conduct an audit of the data and the monitoring systems at some time, and when this happens the baseline air quality studies must not be found lacking. Such a conclusion would provide ammunition to those opposing oil shale development, and would cause unfavorable publicity for all concerned.

In addition to installing five stations, Radian designed the entire system specifically for operation in the Tract C-b environment. The shelters are designed to withstand winds of 150 mph and to maintain the interior temperatures within $\pm 3^{\circ}\text{F}$ of any setting if outside temperatures are anywhere in the range of -50°F to $+110^{\circ}\text{F}$. A factory trained Instrument Engineer is assigned full time to Tract C-b, and he is assisted by two operators so that the stations can be checked seven days a week.

RADIAN CORPORATION

Over \$25,000 worth of spare units and spare parts is kept by the Instrument Engineer to minimize down time. The met tower has bivanes which provide redundancy in measuring wind speed and direction at 30, 100, and 200 feet. Each station has a four-hour emergency power supply in case of electric power outages. In spite of all this, data which accurately reflects baseline air quality at Tract C-b has not been obtained 90% of the time, nor has accurate meteorological data been obtained 95% of the time.

It should be noted that in its other monitoring networks Radian is collecting air quality data with efficiencies well over 90% (without the aid of a spare system). The particular environment at Tract C-b is not conducive to collection of air quality data, however. The adverse weather conditions make tending of the system difficult or even dangerous, electrical power is not always reliable, and access to the area is very poor. If a special repairman must be sent in, or if replacement parts must be shipped in, considerable time can be lost between discovering a problem and getting the system back on-line.

Calibration is automatically performed daily at 3 a.m. by the computer in each station. The calibration time is limited to a maximum of 30 minutes, and most channels require much less. Hardcopy printouts of the air quality data and calibration data are provided in each station, and these are examined daily by an operator. The computer also examines the calibration data and compares it to the previous day's calibration, and if drift in excess of the manufacturer's specs occurs, the computer turns on an alarm light on the System Status Panel for that particular data channel. In summary, we know when we have a problem in our systems. In our opinion this contrasts with the great majority of the air monitoring work which has been done in the past where lack of such controls may have resulted in the concept of 90% data collection.

RADIAN CORPORATION

Just as we know when we have a problem, we also know when we are collecting reliable data. All calibration standards are referenced to NBS standards, except for ozone, which is checked by bubbling. The data acquisition system is digital and has a discrimination of $\pm \frac{1}{2}$ ppb so that no uncertainty beyond that inherent in the instruments is introduced into the data. Daily inspection according to a detailed checklist forces the operator to examine enough parameters to tell if the system is working properly. Daily reports are sent from Rifle to Austin via TWX so that Radian's managers are always aware of the status of the system, and can provide immediate assistance when required.

We believe we have taken all reasonable measures, and are happy to demonstrate these in detail to anyone; however, the environment is too difficult for 90%/95% data collection within the context of this memorandum. These stringent requirements not only are unrealistic, they may actually detract from the quality of data obtained. When the monitoring goal is a certain percentage data collection, and not the collection of data which accurately describe the area, this encourages the acceptance of data into the data base which are known to be marginal or inaccurate. Such a situation cannot be tolerated.

Radian has not lowered its standards for data acceptance, however, the penalty for this has been a failure to meet the 90%/95% monitoring requirements.

As additional support for this position, a letter is attached describing the experiences of the Colorado State Department of Health in air quality monitoring. They had six systems being operated by six men, and still did not achieve 90% data collection even though the systems were all in the Denver area which is a much more favorable environment for monitoring.

RADIAN CORPORATION

Because of all the above factors, we believe the 90%/95% monitoring requirements should be changed for Tract C-b.

Form 1279-3
(June 1984)

BORROWER

TD 05 .04 E5871 1

Comments on air qu
for tract C-b

DATE LOANED	BORROWER

USDI - BLM

